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Seminar über Biomedizinische Photonik

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Titel: Experimental and Analytical Investigation of the Ciliary Dynamics of Human Respiratory Cells

We investigated with high-speed microscopy the ciliary dynamics of human respiratory cells. We first considered the optimization of the microscope with the aid of a spatial light modulator (SLM), but this failed because the SLM caused optical disturbances. Furthermore, the influence of Phosphate-Buffered Saline (PBS) and salbutamol on the movement of the cilia was investigated. It was found that in both cases the ciliary beat frequency and the wavelength increased. Further experiments are needed to investigate the temporal influence in more detail. With the help of the optical flow, we were able to calculate the velocity vectors describing the ciliary movement. This made it possible to recognize locally different velocities during the effective and recovery strokes. Furthermore, the path traveled could be determined locally and the ciliary beat distance could be estimated. The results of the optical flow are promising that further development will make it possible to calculate these parameters globally and use them for the characterization of the movement..

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